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ISO 9001:2015 Certified & NABL Accredited Laboratory as per ISO/IEC - 17025-2017

Testing of Construction Material - Mechanical, Soil, Bitumen, Non Destructive Testing Services, Project Management Consultants, Third Party Quality Assurance, DPR.

Job No.: CQCE/BBMP/MC/16/2021-2022

Date 30.03.2022

ATTERBERG LIMITS TEST FOR WMM

Client **Executive Engineer,** R R Nagar Division, BBMP, Bangalore.
Agency : **Sri. Maruthi Construction(H Hanumanthegowda),** Contractor, Bangalore.
Name of Work : Improvements and Asphalting to Selected Cross Roads and Main Roads in Ward No.16, Jalahalli, BBMP, Bangalore
IS Code: IS 2720(Part 5):1985
Date of Testing 28.03.2022 to 30.03.2022
Material Type : Wet Mix Macadam

Sl. No.	Particulars	Test Results	Requirement as per MORTH 5th edition Cl.406.2.1.2
1	Liquid Limit	22.00	-
2	Plasticity Index, %	Non Plastic	6.0% Maximum.

Note:

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For CIVIL QUALITY CONSULTANTS & ENGINEERS

Authorised Signatory

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Job No.: CQCE/BBMP/MC/16/2021-2022

Date 30.03.2022

ATTERBERG LIMITS TEST FOR WMM

Client **Executive Engineer,** R R Nagar Division, BBMP, Bangalore.
Agency **: Sri. Maruthi Construction(H Hanumanthegowda),** Contractor, Bangalore.
Name of Work : Improvements and Asphalting to Selected Cross Roads and Main Roads in Ward No.16, Jalahalli, BBMP, Bangalore
IS Code: IS 2720(Part 5):1985
Date of Testing 28.03.2022 to 30.03.2022
Material Type : Wet Mix Macadam

Sl. No.	Particulars	Test Results	Requirement as per MORTH 5th edition Cl.406.2.1.2
1	Liquid Limit	23.50	-
2	Plasticity Index, %	Non Plastic	6.0% Maximum.

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Job No.: CQCE/BBMP/MC/16/2021-2022

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IS Code: IS 2720(Part 5):1985
Date of Testing 28.03.2022 to 30.03.2022
Material Type : Wet Mix Macadam

Sl. No.	Particulars	Test Results	Requirement as per MORTH 5th edition Cl.406.2.1.2
1	Liquid Limit	20.50	-
2	Plasticity Index, %	Non Plastic	6.0% Maximum.

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Job No.: CQCE/BBMP/MC/16/2021-2022

Date 30.03.2022

ATTERBERG LIMITS TEST FOR WMM

Client **Executive Engineer,** R R Nagar Division, BBMP, Bangalore.
Agency : **Sri. Maruthi Construction(H Hanumanthegowda),** Contractor, Bangalore.
Name of Work : Improvements and Asphalting to Selected Cross Roads and Main Roads in Ward No.16, Jalahalli, BBMP, Bangalore
IS Code: IS 2720(Part 5):1985
Date of Testing 28.03.2022 to 30.03.2022
Material Type : Wet Mix Macadam

Sl. No.	Particulars	Test Results	Requirement as per MORTH 5th edition Cl.406.2.1.2
1	Liquid Limit	24.00	-
2	Plasticity Index, %	Non Plastic	6.0% Maximum.

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Job No.: CQCE/BBMP/MC/16/2021-2022

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Client **Executive Engineer,** R R Nagar Division, BBMP, Bangalore.
Agency **: Sri. Maruthi Construction(H Hanumanthegowda),** Contractor, Bangalore.
Name of Work : Improvements and Asphalting to Selected Cross Roads and Main Roads in Ward No.16, Jalahalli, BBMP, Bangalore
IS Code: IS 2720(Part 5):1985
Date of Testing 28.03.2022 to 30.03.2022
Material Type : Wet Mix Macadam

Sl. No.	Particulars	Test Results	Requirement as per MORTH 5th edition Cl.406.2.1.2
1	Liquid Limit	21.50	-
2	Plasticity Index, %	Non Plastic	6.0% Maximum.

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Testing of Construction Material - Mechanical, Soil, Bitumen, Non Destructive Testing Services, Project Management Consultants, Third Party Quality Assurance, DPR.

Job No.: CQCE/BBMP/MC/16/2021-2022

Date 30.03.2022

ATTERBERG LIMITS TEST FOR WMM

Client **Executive Engineer,** R R Nagar Division, BBMP, Bangalore.
Agency **: Sri. Maruthi Construction(H Hanumanthegowda),** Contractor, Bangalore.
Name of Work : Improvements and Asphalting to Selected Cross Roads and Main Roads in Ward No.16, Jalahalli, BBMP, Bangalore
IS Code: IS 2720(Part 5):1985
Date of Testing 28.03.2022 to 30.03.2022
Material Type : Wet Mix Macadam

Sl. No.	Particulars	Test Results	Requirement as per MORTH 5th edition Cl.406.2.1.2
1	Liquid Limit	24.00	-
2	Plasticity Index, %	Non Plastic	6.0% Maximum.

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Testing of Construction Material - Mechanical, Soil, Bitumen, Non Destructive Testing Services, Project Management Consultants, Third Party Quality Assurance, DPR.

Job No.: CQCE/BBMP/MC/16/2021-2022

Date 30.03.2022

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IS Code: IS 2720(Part 5):1985
Date of Testing 28.03.2022 to 30.03.2022
Material Type **:** Wet Mix Macadam

Sl. No.	Particulars	Test Results	Requirement as per MORTH 5th edition Cl.406.2.1.2
1	Liquid Limit	22.50	-
2	Plasticity Index, %	Non Plastic	6.0% Maximum.

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Testing of Construction Material - Mechanical, Soil, Bitumen, Non Destructive Testing Services, Project Management Consultants, Third Party Quality Assurance, DPR.

Job No: CQCE/BBMP/MC/16/2021-2022 Date: 04.04.2022

TEST REPORT ON PAVING BITUMEN

Client	**Executive Engineer,** R R Nagar Division, BBMP, Bangalore.
Agency	**Sri. Maruthi Construction(H Hanumanthegowda),** Contractor, Bangalore.
Name of work	Improvements and Asphalting to Selected Cross Roads and Main Roads in Ward No.16, Jalahalli, BBMP, Bangalore
BIS Code	IS 73:2013,IS 1203:1978, IS 1208:1978, IS 1205:1978, IS1448(P-69):1969
Date of Testing	**04.04.2022**
Type of Mix	**Dense Graded Bituminous Macadam , VG 30**
Source of Location	**Hot Mix Plant**

The results of the tests conducted on the bitumen sample using for Dense Graded Bituminous Macadam

Sl.No	Description	Test Result	Requirement as per IS:73:2013
1	Penetration at 25 0C, 100gms, 5sec, 1/10 mm	57	Min 45
2	Softening point, 0C	64	Min 47
3	Ductility at 250C, cm	99	Min40
4	Flash Point, 0C	281	Min 220

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JobNo: CQCE/BBMP/MC/16/2021-2022

Testing of Construction Material - Mechanical, Soil, Bitumen, Non Destructive Testing Services, Project Management Consultants, Third Party Quality Assurance, DPR.

TEST RESULTS OF AGGREGATE IMPACT VALUE

Client	**: Executive Engineer,** R R Nagar Division, BBMP, Bangalore.
Agency	**:Sri. Maruthi Construction(H Hanumanthegowda),** Contractor, Bangalore.
Name of work	: Improvements and Asphalting to Selected Cross Roads and Main Roads in Ward No.16, Jalahalli, BBMP, Bangalore
Source / Location	: Hot Mix Plant, Bangalore
BIS Code	: IS 2386 Part (4):1963
Type of Mix	: Dense Graded Bituminous Macadam
Date of test	04.04.2022

Sl No.	Details	Trial No.		Average
		1	2	
1	Total weight of aggregate sample filling the cylindrical measure = W1 g	400	400	
2	Weight of agregate passing 2.36 mm sieve after the test = W2 g	86	88	
3	Weight of aggregate retained 2.36 mm sieve after the test = W3 g	314	312	
5	Aggregate Impact value = percent fines 100* (W2/W1) percent	21.50	22.00	**21.75**

Comments:

→ *Maximum allowable Aggregate Impact value for Dense Graded Bituminous Macadam is 27% (Table 500-8 of MORTH specification)*

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JobNo: CQCE/BBMP/MC/16/2021-2022

Testing of Construction Material - Mechanical, Soil, Bitumen, Non Destructive Testing Services, Project Management Consultants, Third Party Quality Assurance, DPR.

TEST RESULTS OF AGGREGATE IMPACT VALUE

Client	**: Executive Engineer,** R R Nagar Division, BBMP, Bangalore.
Agency	**:Sri. Maruthi Construction(H Hanumanthegowda),** Contractor, Bangalore.
Name of work	: Improvements and Asphalting to Selected Cross Roads and Main Roads in Ward No.16, Jalahalli, BBMP, Bangalore
Source / Location	: Hot Mix Plant, Bangalore
BIS Code	: IS 2386 Part (4):1963
Type of Mix	: Dense Graded Bituminous Macadam
Date of test	04.04.2022

Sl No.	Details	Trial No.		Average
		1	2	
1	Total weight of aggregate sample filling the cylindrical measure = W1 g	400	400	
2	Weight of agregate passing 2.36 mm sieve after the test = W2 g	80	82	
3	Weight of aggregate retained 2.36 mm sieve after the test = W3 g	320	318	
5	Aggregate Impact value = percent fines.	20.00	20.50	**20.25**
	100* (W2/W1) percent			

Comments:

→ Maximum allowable Aggregate Impact value for Dense Graded Bituminous Macadam is 27% (Table 500-8 of MORTH specification)

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Testing of Construction Material - Mechanical, Soil, Bitumen, Non Destructive Testing Services, Project Management Consultants, Third Party Quality Assurance, DPR.

Job No: CQCE/BBMP/MC/16/2021-2022

Date : 08.04.2022

TEST RESULTS OF AGGREGATE SHAPE TEST
(Flakiness & Elongation)

Client : Executive Engineer, R R Nagar Division, BBMP, Bangalore

Agency : Sri. Maruthi Construction(H Hanumanthegowda), Commune, Bangalore

Name of work : Improvement and Asphalting to Selected Cross Roads and Main Roads in Ward No 16, Jalahalli, BBMP, Bangalore

BIS Code : IS 2386 Part (1):1963

Date of Test : 04.04.2022

Type of Mix : Dense Graded Bituminous Macadam

Sl.No.	Flakiness Index Value(%)	Elongation Index Value(%)	Total(Combined Flakiness and Elongation)(%)	Requirements
1	10.50	11.90	22.40	Maximum allowable Combined Flakiness and Elongation Indices for Dense Graded Bituminous Macadam is 35% as per Table 500.8 MORTH Specification.
2	12.20	10.40	22.60	

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Testing of Construction Material - Mechanical, Soil, Bitumen, Non Destructive Testing Services, Project Management Consultants, Third Party Quality Assurance, DPR.

JobNo: CQCE/BBMP/MC/16/2021-2022 Date : 04.04.2022

TEST RESULTS OF AGGREGATE SHAPE TEST (Flakiness & Elongation)

Client : **Executive Engineer,** R R Nagar Division, BBMP, Bangalore.
Agency :**Sri. Maruthi Construction(H Hanumanthegowda),** Contractor, Bangalore.
Name of work : Improvements and Asphalting to Selected Cross Roads and Main Roads in Ward No.16, Jalahalli, BBMP, Bangalore
BIS Code : IS 2386 Part (1):1963
Date of Test : 04.04.2022
Type of Mix : Dense Graded Bituminous Macadam

Sl.No.	Flakiness Index Value(%)	Elongation Index Value(%)	Total(Combined Flakiness and Elongation)(%)	Requirements
1	11.80	10.90	22.70	Maximum allowable Combined Flakiness and Elongation Indices for Dense Graded Bituminous Macadam is 35% as per Table 500.8 MORTH Specification.
2	10.70	11.30	22.00	

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Testing of Construction Material - Mechanical, Soil, Bitumen, Non Destructive Testing Services, Project Management Consultants, Third Party Quality Assurance, DPR.

Job No.: CQCE/BBMP/MC/16/2021-2022

Date: 06.04.2022

Specific Gravity And Water Absorption Test

Client	**: Executive Engineer,** R R Nagar Division, BBMP, Bangalore.
Agency	**: Sri. Maruthi Construction(H Hanumanthegowda),** Contractor, Bangalore.
Name of the Work	: Improvements and Asphalting to Selected Cross Roads and Main Roads in Ward No.16, Jalahalli, BBMP, Bangalore
BIS Code	IS 2386(Part 3):1963
Type of Mix	Dense Graded Bituminous Macadam
Date of Testing	04.04.2022 to 06.04.2022

Sl. No.	Details	Notation	Test Number			Mean Value
			Test 1	Test 2	Test 3	
1	Weight of aggregate suspended in water with the basket	W_1 g	2020	2021	2023	
2	Weight of basket suspended in water	W_2 g	754	754	754	
3	Weight of saturated aggregate in water	$(W_1 - W_2) = W_s$ g	1266	1267	1269	
4	Weight of saturated surface dry aggregate in air	W_3 g	2012	2014	2015	
5	Weight of water equal to the volume of the aggregate	$(W_3 - W_S)$ g	746	747	746	
6	Weight of oven dried aggregate	W_4 g	2006	2008	2010	
7	Specific Gravity	$W_4/(W_3-W_S)$	2.689	2.688	2.694	2.690
8	Apparent Specific gravity	$W_4/(W_4-W_S)$	2.711	2.710	2.713	2.711
9	Water Absorption	$((W_3-W_4)*100)/W_4$	0.30%	0.30%	0.25%	0.28%

Comments:

→ Maximum allowable Aggregate Water absorption value for Dense Graded Bituminous Macadam is 2.0%(As per MORTH table 500.8)

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Job No.: CQCE/BBMP/MC/16/2021-2022

Date: 04.04.2022

Aggregate Gradation Test

Client	**: Executive Engineer,** R R Nagar Division, BBMP, Bangalore.
Agency	**: Sri. Maruthi Construction(H.Hanumanthegowda),** Contractor, Bangalore.
Name of the Work	: Improvements and Asphalting to Selected Cross Roads and Main Roads in Ward No.16, Jalahalli, BBMP, Bangalore
BIS Code	IS 2386(Part 1):1963(RA 2011)
Sample I / D	Hot mix Plant, Bangalore.
Type of Mix	Dense Graded Bituminous Macadam
Date of Testing	04.04.2022

Total Weight of Sample: **10000** gm

SIEVE SIZE, mm	Weight Retained, gm	% Retained	Cummulative % Retained	% Passing	Requirement as per MORTH table 500.10	Remarks
37.50	0	0.0	0	100	100	Gradation satisfies Grade-II MORTH specification
26.50	714	7.1	7.14	92.86	90 - 100	
19.00	1089	10.9	18.03	81.97	71 - 95	
13.20	1365	13.7	31.68	68.32	56 - 80	
4.75	2575	25.8	57.43	42.57	38 - 54	
2.36	1241	12.4	69.84	30.16	28 - 42	
0.300	1102	11.0	80.86	19.14	7 - 21	
0.075	1132	11.3	92.18	7.82	2 - 8	

Total Weight of Sample: **10000** gm

SIEVE SIZE, mm	Weight Retained, gm	% Retained	Cummulative % Retained	% Passing	Requirement as per MORTH table 500.10	Remarks
37.5	0	0.0	0	100	100	Gradation satisfies Grade-II MORTH specification
26.5	697	7.0	6.97	93.03	90 - 100	
19	1154	11.5	18.51	81.49	71 - 95	
13.2	1083	10.8	29.34	70.66	56 - 80	
4.75	2416	24.2	53.50	46.50	38 - 54	
2.360	1137	11.4	64.87	35.13	28 - 42	
0.300	1572	15.7	80.59	19.41	7 - 21	
0.075	1134	11.3	91.93	8.07	2 - 8	

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Job No.: CQCE/BBMP/MC/16/2021-2022

Date: 04.04.2022

Aggregate Gradation Test

Client	**: Executive Engineer,** R R Nagar Division, BBMP, Bangalore.
Agency	**: Sri. Maruthi Construction(H.Hanumanthegowda),** Contractor, Bangalore.
Name of the Work	: Improvements and Asphalting to Selected Cross Roads and Main Roads in Ward No.16, Jalahalli, BBMP, Bangalore
BIS Code	IS 2386(Part 1):1963(RA 2011)
Sample I / D	Hot mix Plant, Bangalore.
Type of Mix	Dense Graded Bituminous Macadam
Date of Testing	04.04.2022

Total Weight of Sample: **10000** gm

SIEVE SIZE, mm	Weight Retained, gm	% Retained	Cummulative % Retained	% Passing	Requirement as per MORTH table 500.10	Remarks
37.50	0	0.0	0	100	100	Gradation satisfies Grade-II MORTH specification
26.50	703	7.0	7.03	92.97	90 - 100	
19.00	1148	11.5	18.51	81.49	71 - 95	
13.20	1269	12.7	31.20	68.80	56 - 80	
4.75	2451	24.5	55.71	44.29	38 - 54	
2.36	1382	13.8	69.53	30.47	28 - 42	
0.300	1006	10.1	79.59	20.41	7 - 21	
0.075	1274	12.7	92.33	7.67	2 - 8	

Total Weight of Sample: **10000** gm

SIEVE SIZE, mm	Weight Retained, gm	% Retained	Cummulative % Retained	% Passing	Requirement as per MORTH table 500.10	Remarks
37.5	0	0.0	0	100	100	Gradation satisfies Grade-II MORTH specification
26.5	717	7.2	7.17	92.83	90 - 100	
19	1208	12.1	19.25	80.75	71 - 95	
13.2	1199	12.0	31.24	68.76	56 - 80	
4.75	2563	25.6	56.87	43.13	38 - 54	
2.360	1242	12.4	69.29	30.71	28 - 42	
0.300	1388	13.9	83.17	16.83	7 - 21	
0.075	1141	11.4	94.58	5.42	2 - 8	

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For CIVIL QUALITY CONSULTANTS & ENGINEERS

Authorised Signatory

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Testing of Construction Material - Mechanical, Soil, Bitumen, Non Destructive Testing Services, Project Management Consultants, Third Party Quality Assurance, DPR.

Job No: CQCE/BBMP/MC/16/2021-2022 Date: 07.04.2022

BITUMEN CONTENT AND GRADATION DETERMINATION OF DENSE GRADED BITUMINOUS MACADAM MIX AASHTO T 164 & AASHTO T 30

Client	: Executive Engineer, R R Nagar Division, BBMP, Bangalore.
Agency	: Sri. Maruthi Construction(H Hanumanthegowda), Contractor, Bangalore.
Name of the Work	: Improvements and Asphalting to Selected Cross Roads and Main Roads in Ward No.16, Jalahalli, BBMP, Bangalore
Date of Testing	07.04.2022

BITUMEN CONTENT DETERMINATION

Description	Test 1	Test 2
1. Weight of Mixture before Test, g	500	500
2. Weight of Mixture after Test, g	477.1	477.4
3. Weight of Asphalt and Mineral matter Extracted, g	-	-
4. Weight of Mineral Matter, g.	-	-
5. Weight of Ash, g		
6. Weight of Bitumen Extracted, g. (corrected)	22.90	22.60
7. Bitumen content in %	4.58	4.52
8. Average	4.55	

GRADATION AFTER EXTRACTION

SIEVE SIZE	Test 1				Requirement as per MORTH table 500.10
mm	Weight Retained, gm	Cummulative Weight Retained	%Cummulative Retained	% Passing	
37.5	0	0	0	100	100
26.5	31.2	31.2	6.5	93.5	90 - 100
19	79.6	110.8	23.2	76.8	71 - 95
13.2	61.5	172.3	36.1	63.9	56 - 80
4.75	81.4	253.7	53.2	46.8	38 - 54
2.360	73.7	327.4	68.6	31.4	28 - 42
0.300	96.8	424.2	88.9	11.1	7 - 21
0.075	23.4	447.6	93.8	6.2	2 - 8

SIEVE SIZE	Test 2				Requirement as per MORTH table 500.10
mm	Weight Retained, gm	Cummulative Weight Retained	%Cummulative Retained	% Passing	
37.5	0	0	0	100	100
26.5	32.8	32.8	6,9	93.1	90 - 100
19	76.4	109.2	22.9	77.1	71 - 95
13.2	60.8	170	35.6	64.4	56 - 80
4.75	84.30	254.3	53.3	46.7	38 - 54
2.360	71.4	325.7	68.2	31.8	28 - 42
0.300	94.8	420.5	88.1	11.9	7 - 21
0.075	21.9	442.4	92.7	7.3	2 - 8

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Testing of Construction Material - Mechanical, Soil, Bitumen, Non Destructive Testing Services, Project Management Consultants, Third Party Quality Assurance, DPR.

Job No.: CQCE/BBMP/MC/16/2021-2022

Date: 07.04.2022

BITUMEN CONTENT AND GRADATION DETERMINATION OF DENSE GRADED BITUMINOUS MACADAM MIX AASHTO T 164 & AASHTO T 30

Client	: Executive Engineer, R R Nagar Division, BBMP, Bangalore.
Agency	: Sri. Maruthi Construction(H Hanumanthegowda), Contractor, Bangalore.
Name of the Work	: Improvements and Asphalting to Selected Cross Roads and Main Roads in Ward No.16, Jalahalli, BBMP, Bangalore
Date of Testing	07.04.2022

BITUMEN CONTENT DETERMINATION

Description	Test 1	Test 2
1. Weight of Mixture before Test, g	500	500
2. Weight of Mixture after Test, g	477.3	477.6
3. Weight of Asphalt and Mineral matter Extracted, g	-	-
4. Weight of Mineral Matter, g.	-	-
5. Weight of Ash, g		
6. Weight of Bitumen Extracted, g. (corrected)	22.70	22.40
7. Bitumen content in %	4.54	4.48
8. Average	4.51	

GRADATION AFTER EXTRACTION

SIEVE SIZE	Test 1				Requirement as per MORTH table 500.10
mm	Weight Retained, gm	Cummulative Weight Retained	%Cummulative Retained	% Passing	
37.5	0	0	0	100	100
26.5	33.7	33.7	7.1	92.9	90 - 100
19	75.8	109.5	22.9	77.1	71 - 95
13.2	61.8	171.3	35.9	64.1	56 - 80
4.75	81.4	252.7	52.9	47.1	38 - 54
2.360	74.9	327.6	68.6	31.4	28 - 42
0.300	97.8	425.4	89.1	10.9	7 - 21
0.075	20.2	445.6	93.4	6.6	2 - 8

SIEVE SIZE	Test 2				Requirement as per MORTH table 500.10
mm	Weight Retained, gm	Cummulative Weight Retained	%Cummulative Retained	% Passing	
37.5	0	0	0	100	100
26.5	31.9	31.9	6.7	93.3	90 - 100
19	78.7	110.6	23.2	76.8	71 - 95
13.2	62.6	173.2	36.3	63.7	56 - 80
4.75	83.50	256.7	53.7	46.3	38 - 54
2.360	72.1	328.8	68.8	31.2	28 - 42
0.300	98.4	427.2	89.4	10.6	7 - 21
0.075	21.5	448.7	93.9	6.1	2 - 8

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Testing of Construction Material - Mechanical, Soil, Bitumen, Non Destructive Testing Services, Project Management Consultants, Third Party Quality Assurance, DPR.

Job No.: CQCE/BBMP/MC/16/2021-2022

Date: 07.04.2022

TEST REPORT ON STABILITY OF MIX

Client	:	**Executive Engineer,** R R Nagar Division, BBMP, Bangalore.
Agency	:	**Sri. Maruthi Construction(H Hanumanthegowda),** Contractor, Bangalore.
Name of the Work	:	Improvements and Asphalting to Selected Cross Roads and Main Roads in Ward No.16, Jalahalli, BBMP, Bangalore
Type of Mix	:	Dense Graded Bituminous Macadam
Date of Testing	:	07.04.2022

The results of the tests conducted on the Dense Graded Bituminous Macadam mix sample are as follows:

Sl. No	Description	Test Result 1	Test Result 2	Requirement as per MORTH (Table 500-19)
1	Marshal Stability, Kn	9.74	10.36	9 Kn (min)
2	Marshal flow, mm	3.49	3.68	2 – 4
3	Percent air voids in Mineral Aggregate	14.11	13.27	13 – 15
4	Voids in Compacted Mix	3.66	3.28	3 – 6
5	Percent Voids filled with Bitumen	67.14	69.49	65 - 75
6	Density, g/cc	2.27	2.25	--

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Testing of Construction Material - Mechanical, Soil, Bitumen, Non Destructive Testing Services, Project Management Consultants, Third Party Quality Assurance, DPR.

Job No.: CQCE/BBMP/MC/16/2021-2022

Date: 07.04.2022

TEST REPORT ON STABILITY OF MIX

Client	:	**Executive Engineer,** R R Nagar Division, BBMP, Bangalore.
Agency	:	**Sri. Maruthi Construction(H Hanumanthegowda),** Contractor, Bangalore.
Name of the Work	:	Improvements and Asphalting to Selected Cross Roads and Main Roads in Ward No.16, Jalahalli, BBMP, Bangalore
Type of Mix	:	Dense Graded Bituminous Macadam
Date of Testing	:	07.04.2022

The results of the tests conducted on the Dense Graded Bituminous Macadam mix sample are as follows:

Sl. No	Description	Test Result 1	Test Result 2	Requirement as per MORTH (Table 500-19)
1	Marshal Stability, Kn	9.43	10.25	9 Kn (min)
2	Marshal flow, mm	2.19	3.57	2 – 4
3	Percent air voids in Mineral Aggregate	13.16	14.55	13 – 15
4	Voids in Compacted Mix	3.27	56.93	3 – 6
5	Percent Voids filled with Bitumen	67.98	72.07	65 - 75
6	Density, g/cc	2.26	2.25	--

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Testing of Construction Material - Mechanical, Soil, Bitumen, Non Destructive Testing Services, Project Management Consultants, Third Party Quality Assurance, DPR.

Job No: CQCE/BBMP/MC/16/2021-2022

Date: 06.04.2022

TEST REPORT

Client	:	**: Executive Engineer,** R R Nagar Division, BBMP, Bangalore.
Agency	:	**Sri. Maruthi Construction(H Hanumanthegowda),** Contractor, Bangalore.
Name of the work	:	Improvements and Asphalting to Selected Cross Roads and Main Roads in Ward No.16, Jalahalli, BBMP, Bangalore
IS Code	:	IS 73:2013, IS 1203:1978(RA 2008), IS 1205:1978(RA 2009), IS 1208:1978(RA 2009), IS 1209:1978(RA 2009)
Source of location	:	Hot mix Plant, Bangalore, VG 30
Date of testing	:	06.04.2022

The results of the tests conducted on the bitumen sample using for Bituminous Concrete

Sl. No	Description	Test Result	Requirement as per IS:73:2013
1	Penetration at 25 ^{0}C, 1/10 mm	49	Min 45
2	Softening point, ^{0}C	56	Min. 47
3	Ductility at 27^{0}C, cm	> 100	Min. 40
4	Flash Point, ^{0}C	278	Min. 220

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Testing of Construction Material - Mechanical, Soil, Bitumen, Non Destructive Testing Services, Project Management Consultants, Third Party Quality Assurance, DPR.

Job No.: CQCE/BBMP/MC/16/2021-2022

Date: 06.04.2022

Aggregate Impact Value

Client	**: Executive Engineer,** R R Nagar Division, BBMP, Bangalore.
Agency	**: Sri. Maruthi Construction(H Hanumanthegowda),** Contractor, Bangalore.
Name of the Work	: Improvements and Asphalting to Selected Cross Roads and Main Roads in Ward No.16, Jalahalli, BBMP, Bangalore
BIS Code	IS 2386(Part 4):1963
Source / Location	Hot Mix Plant, Bangalore
Type of Mix	Bituminous Concrete
Date of Testing	06.04.2022

Sl No.	Details	Test No.		Average
		1	2	
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	381	383	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	89	87	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	292	296	
4	Aggregate Impact value = percent fines			
	100* (W_2/W_1) percent	23.36	22.72	**23.04**

Comments:

→ Maximum allowable Aggregate Impact value for Bituminous Concrete is 24%(MORTH table no.500.16)

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Testing of Construction Material - Mechanical, Soil, Bitumen, Non Destructive Testing Services, Project Management Consultants, Third Party Quality Assurance, DPR.

Job No.: CQCE/BBMP/MC/16/2021-2022

Date : 06.04.2022

DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Client	: **Executive Engineer,** R R Nagar Division, BBMP, Bangalore.
Agency	: **Sri. Maruthi Construction(H Hanumanthegowda),** Contractor, Bangalore.
Name of Work	: Improvements and Asphalting to Selected Cross Roads and Main Roads in Ward No.16, Jalahalli, BBMP, Bangalore
Technical Reference	IS 2386(Part 1) 1963 (RA 2011)
Type of Mix	Bituminous Concrete
Date of Testing	06.04.2022

Sl no	Test	1	2	Requirements as per MORTH 5th edition table no 500.16
1	Flakiness Index	11.9	12.2	Combined Flakiness & Elongation index Max 35%
2	Elongation Index	10.5	10.7	
	Combined Flakiness & Elongation index	22.40	22.90	

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Testing of Construction Material - Mechanical, Soil, Bitumen, Non Destructive Testing Services, Project Management Consultants, Third Party Quality Assurance, DPR.

Job No : CQCE/BBMP/MC/16/2021-2022

Date : 08.04.2022

Specific Gravity And Water Absorption Test

Client	: Executive Engineer, R R Nagar Division, BBMP, Bangalore
Agency	: Sri. Maruthi Construction(H Hanumanthegowda), Contractor, Bangalore
Name of the Work	: Improvements and Asphalting to Selected Cross Roads and Main Roads in Ward No.16, Jalahalli, BBMP, Bangalore
BIS Code	IS 2386(Part 3):1963
Type of Mix	Bituminous Concrete
Date of Testing	06.04.2022 to 08.04.2022

Sl. No.	Details	Notation	Test Number			Mean Value
			Test 1	Test 2	Test 3	
1	Weight of aggregate suspended in water with the basket	W_1 g	2023	2022	2020	
2	Weight of basket suspended in water	W_2 g	755	755	755	
3	Weight of saturated aggregate in water	$(W_1 - W_2) = W_s$ g	1268	1267	1265	
4	Weight of saturated surface dry aggregate in air	W_3 g	2012	2014	2015	
5	Weight of water equal to the volume of the aggregate	$(W_3 - W_S)$ g	744	747	750	
6	Weight of oven dried aggregate	W_4 g	2006	2008	2009	
7	Specific Gravity	$W_4/(W_3-W_S)$	2.696	2.688	2.679	2.688
8	Apparent Specific gravity	$W_4/(W_4-W_S)$	2.718	2.710	2.700	2.709
9	Water Absorption	$((W_3-W_4)*100)/W_4$	0.30%	0.30%	0.30%	0.30%

Comments:

→ Maximum allowable Aggregate Water absorption value for Bituminous Concrete is 2.0%(MORTH table 500.16)

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Testing of Construction Material - Mechanical, Soil, Bitumen, Non Destructive Testing Services, Project Management Consultants, Third Party Quality Assurance, DPR.

Job No.: CQCE/BBMP/MC/16/2021-2022

Aggregate Gradation Test

IS : 2386 Part I

Date : 06.04.2022

Client	: Executive Engineer, R R Nagar Division, BBMP, Bangalore
Agency	:Sri. Maruthi Construction(H Hanumanthegowda), Contractor, Bangalore.
Name of the Work	: Improvements and Asphalting to Selected Cross Roads and Main Roads in Ward No.16, Jalahalli, BBMP, Bangalore
BIS Code	IS 2386(Part 1):1963
Sample I / D	Hot Mix Plant, Bangalore
Type of Mix	Bituminous Concrete
Date of Testing	06.04.2022

Total Weight of Sample: **5000** gm

SIEVE SIZE, mm	Weight Retained, gm	% Retained	Cummulative % Retained	% Passing	Requirement as per MORTH table 500.17	Remarks
19	0	0	0	100	100	Gradation satisfies Bituminous concrete Grade-II specification as per MORTH
13.2	419	8.38	8.38	91.62	90 - 100	
9.5	465	9.30	17.68	82.32	70 - 88	
4.75	612	12.24	29.92	70.08	53 - 71	
2.36	657	13.14	43.06	56.94	42 - 58	
1.18	523	10.46	53.52	46.48	34 - 48	
0.600	569	11.38	64.90	35.10	26 - 38	
0.300	501	10.02	74.92	25.08	18 - 28	
0.150	346	6.92	81.84	18.16	12 - 20	
0.075	474	9.48	91.32	8.68	4 - 10	

Total Weight of Sample: **5000** gm

SIEVE SIZE, mm	Weight Retained, gm	% Retained	Cummulative % Retained	% Passing	Requirement as per MORTH table 500.17	Remarks
19	0	0	0	100	100	Gradation satisfies Bituminous concrete Grade-II specification as per MORTH
13.2	404	8.08	8.08	91.92	90 - 100	
9.5	495	9.90	17.98	82.02	70 - 88	
4.75	654	13.08	31.06	68.94	53 - 71	
2.36	732	14.64	45.70	54.30	42 - 58	
1.18	595	11.90	57.60	42.40	34 - 48	
0.600	521	10.42	68.02	31.98	26 - 38	
0.300	516	10.32	78.34	21.66	18 - 28	
0.150	227	4.54	82.88	17.12	12 - 20	
0.075	518	10.36	93.24	6.76	4 - 10	

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Testing of Construction Material - Mechanical, Soil, Bitumen, Non Destructive Testing Services, Project Management Consultants, Third Party Quality Assurance, DPR.

Job No.: CQCE/BBMP/MC/16/2021-2022

Date : 09.04.2022

BITUMEN CONTENT AND GRADATION DETERMINATION OF BITUMINOUS CONCRETE

AASHTO T 164 & AASHTO T 30

CLIENT	: Executive Engineer, R R Nagar Division, BBMP, Bangalore.
AGENCY	: Sri. Maruthi Construction(H Hanumanthegowda), Contractor, Bangalore.
NAME OF THE WORK	: Improvements and Asphalting to Selected Cross Roads and Main Roads in Ward No.16, Jalahalli, BBMP, Bangalore
SAMPLE ID	Hot Mix Plant, Bangalore
DATE OF TESTING	09.04.2022

BITUMEN CONTENT DETERMINATION

Description	Sample 1	Sample 2
1. Weight of Mixture before Test, g	500	500
2. Weight of Mixture after Test, g	472.4	472.8
3. Weight of Asphalt and Mineral matter Extracted, g	27.6	27.2
4. Weight of Mineral Matter, g.	-	-
5. Weight of Ash, g	-	-
6. Weight of Bitumen Extracted, g. (corrected)	27.6	27.2
7. Bitumen content in %	5.52	5.44
8. Average	5.48	

GRADATION AFTER EXTRACTION

SIEVE SIZE mm	Test 1 Weight Retained, gm	Cummulative Weight Retained	%Cummulative Retained	% Passing	Requirement as per MORTH table 500.17
19	0	0	0	100	100
13.2	12.2	12.2	2.6	97.4	90 - 100
9.5	61.8	74	15.7	84.3	70 - 88
4.75	96.7	170.7	36.1	63.9	53 - 71
2.36	45.3	216	45.7	54.3	42 - 58
1.18	42.1	258.1	54.6	45.4	34 - 48
0.600	51.5	309.6	65.5	34.5	26 - 38
0.300	44.8	354.4	75.0	25.0	18 - 28
0.150	36.9	391.3	82.8	17.2	12 - 20
0.075	52.4	443.7	93.9	6.1	4 - 10

SIEVE SIZE mm	Test 2 Weight Retained, gm	Cummulative Weight Retained	%Cummulative Retained	% Passing	Requirement as per MORTH table 500.17
19	0	0	0	100	100
13.2	13.6	13.6	2.9	97.1	90 - 100
9.5	62.8	76.4	16.2	83.8	70 - 88
4.75	94.6	171	36.2	63.8	53 - 71
2.36	45.7	216.7	45.8	54.2	42 - 58
1.18	46.3	263	55.6	44.4	34 - 48
0.600	50.2	313.2	66.2	33.8	26 - 38
0.300	43.7	356.9	75.5	24.5	18 - 28
0.150	33.8	390.7	82.6	17.4	12 - 20
0.075	41.2	431.9	91.3	8.7	4 - 10

For CIVIL QUALITY CONSULTANTS & ENGINEE

Note:

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Authorised Signatory

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ISO 9001:2015 Certified & NABL Accredited Laboratory as per ISO/IEC - 17025-2017

Testing of Construction Material - Mechanical, Soil, Bitumen, Non Destructive Testing Services, Project Management Consultants, Third Party Quality Assurance, DPR.

Job No.: CQCE/BBMP/MC/16/2021-2022

Date : 09.04.2022

BITUMEN CONTENT AND GRADATION DETERMINATION OF BITUMINOUS CONCRETE

AASHTO T 164 & AASHTO T 30

CLIENT	: Executive Engineer, R R Nagar Division, BBMP, Bangalore.
AGENCY	: Sri. Maruthi Construction(H Hanumanthegowda), Contractor, Bangalore.
NAME OF THE WORK	: Improvements and Asphalting to Selected Cross Roads and Main Roads in Ward No.16, Jalahalli, BBMP, Bangalore.
SAMPLE ID	Hot Mix Plant, Bangalore
DATE OF TESTING	09.04.2022

BITUMEN CONTENT DETERMINATION

Description	Sample 1	Sample 2
1. Weight of Mixture before Test, g	500	500
2. Weight of Mixture after Test, g	472.5	472.9
3. Weight of Asphalt and Mineral matter Extracted, g	27.5	27.1
4. Weight of Mineral Matter, g.	-	-
5. Weight of Ash, g	-	-
6. Weight of Bitumen Extracted, g. (corrected)	27.5	27.1
7. Bitumen content in %	5.50	5.42
8. Average	5.46	

GRADATION AFTER EXTRACTION

SIEVE SIZE mm	Test 1 Weight Retained, gm	Cummulative Weight Retained	%Cummulative Retained	% Passing	Requirement as per MORTH table 500.17
19	0	0	0	100	100
13.2	12.9	12.9	2.7	97.3	90 - 100
9.5	60.5	73.4	15.5	84.5	70 - 88
4.75	94.4	167.8	35.5	64.5	53 - 71
2.36	46.2	214	45.3	54.7	42 - 58
1.18	40.7	254.7	53.9	46.1	34 - 48
0.600	52.5	307.2	65.0	35.0	26 - 38
0.300	46.9	354.1	74.9	25.1	18 - 28
0.150	37.8	391.9	82.9	17.1	12 - 20
0.075	52.1	444	94.0	6.0	4 - 10

SIEVE SIZE mm	Test 2 Weight Retained, gm	Cummulative Weight Retained	%Cummulative Retained	% Passing	Requirement as per MORTH table 500.17
19	0	0	0	100	100
13.2	13.1	13.1	2.8	97.2	90 - 100
9.5	61.6	74.7	15.8	84.2	70 - 88
4.75	92.9	167.6	35.4	64.6	53 - 71
2.36	44.7	212.3	44.9	55.1	42 - 58
1.18	45.5	257.8	54.5	45.5	34 - 48
0.600	51.6	309.4	65.4	34.6	26 - 38
0.300	42.3	351.7	74.4	25.6	18 - 28
0.150	35.3	387	81.8	18.2	12 - 20
0.075	50.2	437.2	92.5	7.5	4 - 10

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Testing of Construction Material - Mechanical, Soil, Bitumen, Non Destructive Testing Services, Project Management Consultants, Third Party Quality Assurance, DPR.

Job No : CQCE/BBMP/MC/16/2021-2022

Date: 09.04.2022

TEST REPORT ON STABILITY OF MIX

Client	:	: Executive Engineer, R R Nagar Division, BBMP, Bangalore.
Agency	:	Sri. Maruthi Construction(H Hanumanthegowda), Contractor, Bangalore.
Name of the Work	:	Improvements and Asphalting to Selected Cross Roads and Main Roads in Ward No.16, Jalahalli, BBMP, Bangalore
Source of location	:	Hot mix Plant, Bangalore
Type of Mix	:	Bituminous Concrete
Date of Testing	:	09.04.2022

The results of the tests conducted on the Bituminous Concrete mix sample are as follows:

Sl. No	Description	Test Result 1	Test Result 2	Requirement as per MORTH (Table 500-19)
1	Marshal Stability, Kn	9.44	10.57	9 Kn (min)
2	Marshal flow, mm	3.98	2.12	2 – 4
3	Percent air voids in Mineral Aggregate	13.53	14.64	13 – 15
4	Voids in Compacted Mix	3.18	4.52	3 – 6
5	Percent Voids filled with Bitumen	67.03	74.11	65 - 75
6	Density, g/cc	2.25	2.26	--

Note:

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